



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 1 270 711 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
02.01.2003 Bulletin 2003/01

(51) Int Cl.7: **C11D 3/18, C11D 17/00**

(21) Application number: **01115595.9**

(22) Date of filing: **28.06.2001**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE TR**  
Designated Extension States:  
**AL LT LV MK RO SI**

- Hart, Gerald  
Surbiton, Surrey KT5 8BD (GB)
- Brown, Colin  
Engham, Surrey TW20 8LP (GB)

(71) Applicant: **Givaudan SA**  
**1214 Vernier-Genève (CH)**

(74) Representative: **Simmons, John Murray, Dr.**  
**Givaudan Duebendorf AG,**  
**Überlandstrasse 138**  
**8600 Dübendorf (CH)**

(72) Inventors:  
• **Shaukat, Anjum**  
**Twickenham, Middlesex TW2 6RX (GB)**

(54) **Fabric-cleaning compositions**

(57) The invention is concerned with post-foaming cleaning compositions which may be dispensed from a pressurised container. The compositions contain a post-foaming agent, for example a volatile hydrocarbon which boils and causes the composition to fizz on the

surface of a fabric to be cleaned thereby enhancing the cleaning effect. The compositions contain high amount of volatile hydrocarbon, i.e. about 20 to 40% by weight.

**EP 1 270 711 A1**

**BEST AVAILABLE COPY**

## Description

[0001] This invention relates to a post-foaming cleaning composition which may be applied to a surface to be cleaned and which foams at that surface to provide a cleaning effect.

[0002] Post-foaming cleaning compositions are known in the art. Such compositions contain a post-foaming agent, typically a hydrocarbon that is volatile at room temperature and pressure, that boils when discharged from a container causing the composition to foam. Typical post-foaming cleaning compositions are disclosed in US patents 6,004,920, 5,962,396 and 6,051,542.

[0003] The post-foaming compositions described in the aforementioned patents contain relatively low amounts of volatile hydrocarbon, i.e. about 7 to 14% by weight of iso-pentane. This relatively low amount of post-foaming agent limits the cleaning effect of such compositions. In addition, the low quantities of volatile hydrocarbon are insufficient to provide the composition with satisfactory propellant effect in order to discharge itself effectively from its container upon actuation of the container. Accordingly, not only do such compositions have limited cleaning effect, they must be packaged in containers which provide propellant means external of the composition. Such containers, e.g. the so-called bag-in-can containers are relatively expensive compared with standard aerosol canisters.

[0004] However, as one attempts to incorporate higher amounts of volatile hydrocarbon into post-foaming cleaning compositions, so the volatile hydrocarbon displays an increased tendency to form a separate phase from the remaining components of the composition. This is undesirable because phase-separated hydrocarbon does not have as effective a cleaning or foaming effect as hydrocarbon mixed or dissolved in the composition. Accordingly, whereas phase-separated hydrocarbon could act as a propellant, its cleaning or foaming effect would not be in proportion to the increase in the amounts of hydrocarbon employed.

[0005] Accordingly, there remains a need to provide cleaning compositions with efficient cleaning power that may be dispensed from relatively cheap pressurised containers.

[0006] It has now been found that it is possible to produce a composition containing post-foaming and propellant quantities of liquid hydrocarbon that is stable to phase separation.

[0007] The invention therefore provides in a first aspect a post-foaming cleaning composition comprising a post-foaming agent in an amount of at least 20% and more preferably from 20 to 40% by weight based on the total weight of the composition.

[0008] The post-foaming agent may be dissolved or mixed in the composition in higher amounts than have heretofore been possible. When discharged onto a surface to be cleaned the composition penetrates the surface whereupon the post-foaming agent boils causing the composition to foam vigorously and for extended periods of time, e.g. for up to 15 minutes. Vigorous foaming not only provides a visible and audible key which suggests to the user that the composition is working effectively, it also, by virtue of the mechanical action of the foam on the surface to be cleaned, facilitates and enhances the cleaning action. In contrast, if the post-foaming agent is substantially phase-separated in the dispensing device, it will be dispensed separately from the remainder of the composition. In addition to the reduced cleaning or foaming effect aforementioned, the dispensed free post-foaming agent is unsightly for the user and suggests that the composition has malfunctioned.

[0009] In a preferred embodiment of the invention the post-foaming agent is a hydrocarbon, and may be any of those hydrocarbons that are volatile at room temperature and pressure and which are useful as post-foaming agents and propellants, for example a saturated aliphatic hydrocarbon having from 4 to 5 carbon atoms, more particularly n-butane, iso-butane, n-pentane or iso-pentane, or mixtures thereof. Most preferred is n-pentane.

[0010] A composition according to the invention may have the form a low viscosity free-flowing liquid. The viscosity should be such that when dispensed, the composition is mobile, in order that it may wet and penetrate readily into the surface to be cleaned, e.g. the surface of a fabric, such that the foaming occurs substantially within the weave of the fabric thereby to mechanically agitate the fabric for better stain removal. The foam produced by the composition should be rather mobile and unstable. Rigid, stable foams, typical of the gel-like foamable compositions in the prior art, would have the disadvantage of holding or lifting large amounts of the cleaning actives away from the surface to be cleaned. Stable foams would also contribute to undesirable foaming in a washing machine used to clean a fabric subsequent to its treatment with a post-foaming composition.

[0011] Preferred compositions according to the invention have a viscosity at 25°C of up to about 400 centipoise, more particularly 250 to 350 centipoise.

[0012] Compositions according to the invention may contain any of those components employed in post-foaming cleaning compositions known in the art. Typically a composition may comprise a hydrophobic component, a hydrophilic component, a surfactant component, and other adjuvants or additives commonly employed in the art.

[0013] The hydrophilic component is water, e.g. de-ionised water, preferably present in amounts of about 20 to 40% by weight of the total composition.

[0014] As hydrophobic component there may be mentioned those water insoluble saturated or unsaturated organic compounds having from 4 to 30 carbon atoms commonly used in the formation of an oil-phase. Preferred as the hy-

drophobic component are isoparaffinic hydrocarbons, in particular those having a boiling point in the range of about 113 to 143°C. A typical example of a suitable hydrophobic component is ISOPAR E® from Exxon Chemicals Europe Inc. The hydrophobic component is preferably used in an amount of about 15 to 20% by weight, more preferably 15.75 to 19.25% by weight.

**[0015]** The surfactant component comprises a fatty alcohol alkoxylate, more particularly a C13 to C15 fatty alcohol ethoxylate. The ethylene oxide (EO) content of the fatty alcohol ethoxylate may vary between 1 to 5 EO units per fatty alcohol unit, more particularly, 3 EO units per fatty alcohol unit. The fatty alcohol ethoxylate preferably has an Hydrophilic Lipophilic Balance (HLB) of about 4 to 10. A suitable example is Lutensol AO3®, BASF AG, Ludwigshafen, Germany.

**[0016]** The presence of the fatty alcohol alkoxylate is believed to play an important role in stain removal and stabilising the composition, that is, it offers classical detergency properties and also assists in the formation of a composition comprising high amounts of post-foaming agent, and reduces the tendency for the post-foaming agent to form a separate phase. The precise amounts of fatty alcohol alkoxylate needed to provide a stain-removing and stabilising effect may vary within wide limits depending on the nature and amount of other components present in the composition. However, having been apprised of the significance this component, the skilled person would be able to experiment without undue burden to determine an appropriate quantity of this component for a given composition.

**[0017]** Preferred compositions according to the invention contain fatty alcohol alkoxylate, e.g. fatty alcohol ethoxylate in an amount of greater than about 7% by weight, more particularly about 7 to 13% by weight of the total composition. Within this preferred range, higher amounts of surfactant promote stability of the composition. However, if the amount of surfactant exceeds the upper limit the stain-removing effect when a treated fabric is washed diminishes.

**[0018]** The surfactant component may comprise a mixture of surfactants, thus in a preferred embodiment the composition comprises a first and second surfactant component.

**[0019]** The first surfactant component is a fatty alcohol ethoxylate as hereinabove described.

**[0020]** The second surfactant component may be a fatty alcohol alkoxylate and is different from said first surfactant component. It may be any of those primary aliphatic alcohol alkoxylates known for use in stain removing compositions in the art. Preferably the second surfactant component is a C12-C18 semi-linear fatty alcohol ethoxylate butoxylate, which preferably has a cloud point in water of between 28 and 42°C. A particularly preferred second surfactant component is Plurafac LF221 from BASF AG.

**[0021]** The second surfactant component may be employed in amounts of about 1.5 to 2.5% by weight, more particularly about 1.9 to 2.3 % by weight based on the total weight of the composition.

**[0022]** The composition may comprise other adjuvants that serve to stabilise the interfacial tension between the hydrophilic and hydrophobic components. These components are often referred to as co-surfactants and co-solvents. The composition may comprise one or more of these co-surfactants in appropriate quantities to achieve a stabilised composition. The nature and precise quantities of co-surfactants used in a composition may be determined by the skilled person without undue burden and using only routine experimentation, having regard to the nature and relative proportions of the hydrophilic and hydrophobic components.

**[0023]** The compositions preferably employ first and second co-surfactants. Said first co-surfactant may be selected from any of those di-alkylsulphosuccinates known in the art. More particularly, the first co-surfactant is a sodium di-alkyl sulphosuccinate, e.g. sodium dioctylsulphosuccinate. The first co-surfactant may be employed in amounts of about 1.9 to 2.4% by active weight based on the total weight of the composition. Preferably the first co-surfactant is Rewopol SBDO 75, Goldschmidt AG, Germany.

**[0024]** A second co-surfactant may be selected from any of the long chain unsaturated fatty acids useful as co-surfactants, in particular C<sub>16</sub> to C<sub>18</sub> unsaturated fatty acids, more particularly oleic acid. Said second co-surfactant may be employed in amounts of about 2.5 to 3.1% by active weight based on the total weight of the composition. Preferably said second co-surfactant is Priolene 6992, Uniqema, England.

**[0025]** A co-solvent may be selected from short-chained linear or branched aliphatic alcohols, e.g. iso-propanol. Said co-solvent may be present in amounts of about 7.5 to about 9.3% by weight of the total weight of the composition.

**[0026]** The pH of the composition is preferably in the range of about 8 to 9, more preferably 8.2 to 8.7. To maintain the composition at slightly alkaline pH it is preferred to employ an alkaline substance such as an alkali metal hydroxide, e.g. sodium hydroxide.

**[0027]** Additionally, compositions may comprise other additives or adjuvants commonly used in post-foaming cleaning compositions, for example preservatives or fragrances, provided that such agents do not adversely affect the properties of the composition. These additives may be employed in conventional amounts and preferably do not constitute more than about 1% by weight of the total composition, for example fragrances or preservatives may be added in small amounts, e.g. about 0.1 to 1.0% by weight and about 0.005 to about 0.1% by weight respectively.

**[0028]** In a preferred embodiment of the present invention there is provided a post-foaming cleaning composition comprising about 20 to 40 weight percent (wt%) of deionised water; 20 to 40 wt% n-butane; 15.75% to 19.25 wt% isoparaffinic hydrocarbon with a boiling point of 113 to 143°C; 7.5 to 9.3 wt% isopropanol; 7.1 to 13.0 wt% fatty alcohol ethoxylate (HLB 4 to 10); 2.5 to 3.1 wt % sodium di-alkyl sulphosuccinate (75%); 1.9 to 2.3 wt % of a fatty alcohol

ethoxylate butoxylate having a cloud point in water of between 28 and 42°C; 2.5 to 3.1% oleic acid; 0.32 to 0.38 wt% sodium hydroxide (47%); optionally 0.1 to 1.0 wt% of a fragrance material; and optionally 0.005 to 0.1 wt% of a preservative, e.g. 2-bromo-2-nitropropane-1,3-diol.

**[0029]** The hydrophilic component and the post-foaming agent are the components present in the greatest quantity in a composition of the present invention, and together they may consist of up to about 80% by weight of the composition. The ratio of these combined components (hereinafter A) to the remaining components with the exception of any fragrance and preservatives (hereinafter B) may vary within a wide range without affecting the stability or effectiveness of the composition. Preferably the weight ratio A:B may be from about 1.4:1 to about 1.1:1. Particularly preferred compositions comprise components A in an amount of about 58.126 weight percent and components B in an amount of about 41.650 weight percent; or, components A in an amount of about 55.126 weight percent and components B in an amount of about 44.650 weight percent; or components A in an amount of about 52.126 weight percent and components B in an amount of about 47.650 weight percent. Any remaining mass is made up by fragrances and preservatives.

**[0030]** Compositions according to the invention are preferably microemulsions. Microemulsion compositions are preferably employed because of their ability to wet both hydrophobic and hydrophilic surfaces. This may be particularly beneficial when a fatty stain is to be cleaned from a hydrophilic surface presented by certain fabrics, e.g. cotton fabrics.

**[0031]** A composition according to the invention may be made by any procedure commonly known in the art for the preparation of post-foaming cleaning compositions. A particular method comprises admixing all of the components with the exception of the post-foaming agent until a homogeneous mixture is formed. Thereafter, the mixture may be poured into a conventional aerosol can, a valve assembly fitted to the filled aerosol can and the post-foaming agent added in gaseous form using conventional high-pressure filling equipment. The packaged composition is thereby pressurised at a pressure such that the post-foaming agent is substantially all in the liquid phase and substantially all is dispersed or dissolved in the composition. In the case of n-butane, the post-foaming agent is added under a pressure of about 48 psi ( $3.3 \times 10^5 \text{ N/m}^2$ ).

**[0032]** The invention provides in another of its aspects a packaged composition as hereinabove described. By « packaged » is meant that the composition is provided in containers that are suitable for dispensing such cleaning compositions. Appropriate containers include those containers known in the art that are capable of withstanding cleaning compositions under pressure and include standard tin-plate aerosol cans that may or may not need to be internally lacquered or to be protected from corrosion by the inclusion of inhibitors in the composition.

**[0033]** Whereas the invention is primarily concerned with packaged compositions employing the relatively inexpensive standard aerosol containers, the compositions may also be packaged in the variety of containers known as bag-in-can containers more fully described in US patent 4,964,540. The latter packaged compositions may not be as cost-effective as those employing aerosol canisters, but the dispensed compositions nevertheless realise substantially the same cleaning effect.

**[0034]** Packaged compositions according to the invention are monophasic, that is substantially all of the post-foaming agent is dissolved in, or mixed with, the compositions' other ingredients. A monophasic composition has the advantage that substantially all of the post-foaming agent will be discharged in admixture with the remainder of the composition. Accordingly, as the post-foaming agent boils it causes the composition to fizz and bubble more vigorously and for a longer period of time than would occur if significant amounts of the post-foaming agent were discharged separately.

**[0035]** Due to the relatively high amounts of hydrocarbon post-foaming agent dissolved in compositions according to the invention, the hydrocarbon may act as both post-foaming agent and propellant. This enables compositions according to the invention to be packaged in the relatively inexpensive standard aerosol containers as aforementioned. In such an embodiment, the hydrocarbon may be used as the sole propellant. Alternatively, additional propellants may be used, for example a container may be pressurised with propellant gases such as nitrogen, carbon dioxide, compressed air, halogenated compounds or nitrous oxide. Preferably any additional propellant would not be a volatile organic compound for environmental reasons.

**[0036]** Compositions according to the invention may be applied to surfaces that need to be cleaned to provide efficient pre-spotting, that is, the composition acts on a stain to start the cleaning process and to enable enhanced stain removal during a subsequent wash cycle. Compositions are particularly effective pre-spotters for oily stains, such as vegetable and motor oils, shoe polish and lipstick. The compositions may be used on a variety of fabrics such as cotton, polyester, wool, polyester/cotton, and polyester/wool. Microemulsion compositions are particularly useful as pre-spotters for oily stains on hydrophilic fabrics such as cotton due to the ability of microemulsions to wet both hydrophobic and hydrophilic surfaces.

**[0037]** There now follows a series of examples that serve to illustrate the invention.

Example 1Formation of a post-foaming microemulsion composition

5 [0038] The composition set forth hereinbelow was made according to the following procedure :

1. Add deionised water into a main mixing vessel
2. Add Bronopol with stirring
3. Add the following materials in the order listed and ensure good agitation at 25°C until a homogenous solution is formed: NaOH; Isopropanol; Oleic Acid; C<sub>13</sub>-C<sub>15</sub> linear alcohol ethoxylate 3EO (warm to 25°C before addition); C<sub>13</sub>-C<sub>15</sub> linear alcohol ethoxylate butoxylate; Sodium di-octyl sulphosuccinate 75%; Fragrance.
4. Finally add Isopar E with continuous stirring until the mixture is homogenous and clear at 22°C. Continue stirring for at least 15 minutes.
5. Check pH of the mixture. Adjust to approx. 8.5 if necessary using 30% sodium hydroxide solution or oleic acid. Continue stirring for 20-30 minutes.

[0039] The mixture was poured into a glass aerosol bottle. A valve assembly was fitted over the aerosol bottle prior to introducing the n-butane under a pressure of 48psi. The n-butane dissolved fully in the composition and the final composition had the appearance of a monophasic solution.

	wt%
Deionised water	28.126
n-Butane	30.000
Isoparaffinic hydrocarbon Bpt.113-143 (ISOPAR E - Exxon Chemicals)	17.500
Isopropanol	8.400
C13-C15 linear alcohol ethoxylate 3EO (Lutensol AO3, BASF)	7.700
Sodium di-alkyl sulphosuccinate 75% (Rewopol SBDO 75 Goldschmidt)	2.800
Oleic acid (Priolene 6992 - Uniqema)	2.800
C13-C15 linear alcohol ethoxylate butoxylate (Plurafac LF221, BASF)	2.100
Sodium hydroxide 47%	0.350
Fragrance	0.210
Preservative (Bronopol, BASF)	0.014
pH of formula	8.2 -8.7

Example 2The effect of fatty acid ethoxylate concentration on appearance of compositions

[0040] The following compositions were formed according to the methodology of Example 1. The composition « D » corresponds to the composition of Example 1. All quantities are expressed in weight percent. The linear alcohol ethoxylate was Lutensol AO3 from BASF.

	A	B	C	D	E
Deionised water	24.626	26.726	27.426	28.126	28.826
Butane 48psig	30.000	30.000	30.000	30.000	30.000
Isoparaffinic hydrocarbon	17.500	17.500	17.500	17.500	17.500

BEST AVAILABLE COPY

(continued)

	A	B	C	D	E
Bpt.113-143					
Isopropanol	8.400	8.400	8.400	8.400	8.400
C13-C15 linear alcohol ethoxylate 3EO	11.200	9.100	8.400	7.700	7.000
Sodium di-alkyl sulphasuccinate 75%	2.800	2.800	2.800	2.800	2.800
Oleic acid	2.800	2.800	2.800	2.800	2.800
Fatty alcohol alkoxylate	2.100	2.100	2.100	2.100	2.100
Sodium hydroxide 47%	0.350	0.350	0.350	0.350	0.350
Fragrance	0.210	0.210	0.210	0.210	0.210
Preservative	0.014	0.014	0.014	0.014	0.014

[0041] Compositions A, B, C and D when filled in glass aerosol bottles all gave single-phase systems. Formulation E demonstrated a significant layer of free hydrocarbon above the composition. This suggests that the linear alcohol ethoxylate should be present in an amount of greater than 7% by weight to obtain a monophasic composition.

[0042] Upon discharge from the aerosol container, compositions A, B, C and D all presented as a creamy liquid that bubbled for several seconds on contact with the fabric thus providing a good visible cue as to the cleaning effect. Composition E, however, lacked uniformity, presenting a clear liquid that was essentially pure hydrocarbon.

### Example 3

#### Stain Pre-spotting performance

[0043] All fabric used for this test (100% white cotton) was washed to remove any 'finishing' treatment on the new material. This was done by washing 3-4m of fabric at 40°C (European washing machine) using 50g of non-biological washing powder (Persil automatic). The fabric was partially dried and then ironed to remove creasing. The fabric was then cut into swatches of 14.5cm by 22cm using a zig-zag scissors to prevent fraying. All swatches were ironed again and laid on a worktop ready for staining (matt side up to prevent excess 'wicking').

[0044] Since the compositions would be specifically targeted for removal of stubborn oily stains, the test focused on the four key oily stains which are difficult to remove in a standard wash, viz.

[0045] Vegetable oil - dyed using oil soluble brown dye - 1 drop 0.5% w/w

Motor oil - used engine oil - 1 drop

Shoe polish - black Kiwi® brand - 1 stroke

Lipstick - red or bright pink - 1 stroke

[0046] Drops were applied using pipettes and strokes were applied using a 10mm spatula. All prepared swatches were left to set overnight prior to being tested.

[0047] Washing was conducted under European conditions using European washing machines at 40°C. A 'dummy' load was used, which consisted of 6 cotton terry nappies. 50g of non-biological Persil automatic washing powder was used. 9.5g of pre-spotter was applied to the stained swatch and left for one minute. This was then washed as normal in the washing machine together with the 'dummy' load. The washed swatches were then removed and ironed on the side opposing the stained surface. All testing was conducted in duplicate using non-biological washing powder, either with or without pre-spotter. An untreated swatch was also used to compare the 'before' and 'after' results.

[0048] The stain-removal performance was rated visually by a trained panel using a scale of 1 to 5, Where,

1 = little or no stain removal

5 = complete stain removal

[0049] The results were tabulated and converted into percentage stain removal in order to compare the overall performance.

BEST AVAILABLE COPY

Stains tested							
	Untreated	A	B	C	D	E	Shout®
Vegetable oil	1.0	4.0	4.5	4.5	4.5	4.5	3.5
Motor oil	1.0	2.0	3.0	3.0	4.5	4.5	3.0
Lipstick	1.0	1.5	3.0	3.0	3.0	2.5	1.5
Shoe polish	1.0	1.5	1.5	1.5	1.5	1.5	1.5
TOTAL	4.0	9.0	12.0	12.0	13.5	13.0	9.5
<b>%Stain Removal</b>	<b>20</b>	<b>45</b>	<b>60</b>	<b>60</b>	<b>68</b>	<b>65</b>	<b>48</b>

[0050] The optimum stain removal is given by the formulation with the lowest levels of the linear alcohol ethoxylate.

### Claims

1. A post-foaming cleaning composition comprising a post-foaming agent in an amount of about 20 to 40% by weight.
2. A composition according to claim 1 wherein the post-foaming agent is a volatile hydrocarbon.
3. A composition according to claim 1 or claim 2 wherein the composition is a microemulsion.
4. A post-foaming microemulsion cleaning composition comprising a hydrophilic component, a hydrophobic component, a surfactant component comprising at least 7% by weight aliphatic alcohol ethoxylate, and 20 to 40 % by weight of a volatile hydrocarbon post-foaming agent.
5. A packaged monophasic post-foaming cleaning composition comprising about 20 to 40% of a post-foaming agent.
6. A packaged composition according to claim 6 wherein the packaging is provided by an aerosol canister.
7. A packaged composition according to claim 5 or claim 6 wherein the post-foaming agent is a volatile hydrocarbon.
8. A packaged composition according to any of the claims 5 to 7 wherein the composition is a microemulsion.
9. A composition according to any of the preceding claims comprising 20 to 40 weight percent (wt%) deionised; 20 to 40 wt% n-butane; 15.75% to 19.25 wt% isoparaffinic hydrocarbon with a boiling point of 113 to 143°C; 7.5 to 9.3 wt% isopropanol; 6.0 to 13.0 wt% fatty alcohol ethoxylate (HLB 4 to 10); 2.5 to 3.1 wt % sodium di-alkyl sulphosuccinate (75%); 1.9 to 2.3 wt % of a fatty alcohol alkoxyate having a cloud point in water of between 28 and 42°C; 2.5 to 3.1% oleic acid; 0.32 to 0.38 wt% sodium hydroxide (47%); optionally 0.1 to 1.0 wt% of a fragrance material; and optionally 0.005 to 0.1 wt% of a preservative.
10. A composition according to claim 9 comprising 28.126 wt % Deionised water; 30 wt% n-butane; 17.5 wt% Isoparaffinic hydrocarbon Bpt.113-143; 8.4 wt% Isopropanol; 7.7 wt% C13-C15 linear alcohol ethoxylate 3EO; 2.8 wt% Sodium di-alkyl sulphosuccinate 75%; 2.8 wt% Oleic acid; 2.1 wt% Fatty alcohol alkoxyate having a cloud point in water of between 28 and 42°C; 0.35 wt% Sodium hydroxide 47%; 0.210 wt% fragrance; and 0.014 wt% preservative.
11. A method of pre-spotting a stained fabric comprising the step of applying thereto a composition as described in any of the preceding claims.



European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 01 11 5595

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 4 954 286 A (SEPULVEDA RALPH R ET AL) 4 September 1990 (1990-09-04) * column 1, line 12-15 * * column 2, line 19-32 * * column 4, line 28,29 * * claims 1,13 *	1,2,4-7, 11	C11D3/18 C11D17/00
X	EP 0 890 670 A (JOHNSON & SON INC S C) 13 January 1999 (1999-01-13) * claims 1-11; examples 1,3,4 *	1-3,5-8, 11	
X	US 4 362 638 A (SRAMEK JOHN A ET AL) 7 December 1982 (1982-12-07) * claims 1,2 *	1,2,5-7, 11	
X	GB 1 040 009 A (SHULTON INC) 24 August 1966 (1966-08-24) * page 1, line 55-70; claim 1; example II *	1,2,5-7	
X	US 5 902 225 A (MONSON JAMES A) 11 May 1999 (1999-05-11) * claims 1,8 *	1,2,4-7	TECHNICAL FIELDS SEARCHED (Int.Cl.7) C11D
D,X	US 5 962 396 A (GOMES GILBERT ET AL) 5 October 1999 (1999-10-05) * column 2, line 27 - column 3, line 67; example I *	1,3-6,8	
X	WO 00 39273 A (UNILEVER PLC ;LEVER HINDUSTAN LTD (IN); UNILEVER NV (NL)) 6 July 2000 (2000-07-06) * claims 1,2,6,9,13,23; examples *	1,3,5,6, 8	
X	EP 0 586 295 A (NLN) 9 March 1994 (1994-03-09) * page 4, line 53; claims 1,2 *	1,5,6,11	
The present search report has been drawn up for all claims			
Place of search <b>MUNICH</b>		Date of completion of the search <b>23 November 2001</b>	Examiner <b>Pentek, E</b>
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03-02 (P4/C01)

BEST AVAILABLE COPY



**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 11 5595

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

23-11-2001

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4954286	A	04-09-1990	AU 619271 B2	23-01-1992
			AU 3268389 A	19-10-1989
			BR 8901723 A	21-11-1989
			CA 1322509 A1	28-09-1993
			JP 2014293 A	18-01-1990
			ZA 8902749 A	28-12-1990
EP 0890670	A	13-01-1999	EP 0890670 A2	13-01-1999
US 4362638	A	07-12-1982	NONE	
GB 1040009	A	24-08-1966	NONE	
US 5902225	A	11-05-1999	AU 3896395 A	02-05-1996
			AU 5590296 A	10-10-1996
			WO 9611162 A1	18-04-1996
US 5962396	A	05-10-1999	AU 4206000 A	14-11-2000
			WO 0061710 A2	19-10-2000
			US 6004920 A	21-12-1999
			US 6051542 A	18-04-2000
WO 0039273	A	06-07-2000	AU 1874400 A	31-07-2000
			EP 1141223 A1	10-10-2001
			WO 0039273 A1	06-07-2000
EP 0586295	A	09-03-1994	FR 2695133 A1	04-03-1994
			EP 0586295 A1	09-03-1994

EPO FORM P0495

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

BEST AVAILABLE COPY

**THIS PAGE BLANK (USPTO,**